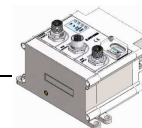


**Mod. TCxP**  
**PROFIBUS**  
**FIELD BUS**  
**MODULE**  
**FOR**  
**PNEUMATIC**  
**MANIFOLD**  
**VALVES**  
**&**  
**I/O SIGNAL**

- **Connection with industry - standard M8-M12-M23-7/8"**
- **Integrated connection to manifold valves - ISO VDMA & Compact Series**
- **24 coils valves capability**
- **Auxiliary max capability of 64digital input + 40digital output**
- **Optical & via network Diagnostic Monitor**
- **IP 65 protection grade**

# Automation

rev.05a8



## INDEX

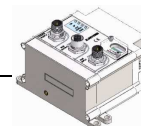
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**Every conceivable measure has been taken to ensure the correctness and completeness of this documentation. However, as errors can never be fully excluded we would appreciate any information or ideas at any time.**

/-----/

**We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally trademark or patent protected.**



## Important note

*To ensure fast installation and start-up of the units described in this manual, we strongly recommend that the following information and explanations are carefully read and abided by.*

### Personnel Qualification

*The use of the product detailed in this manual is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the valid standards. UNIVER S.p.A. declines all liability resulting from improper action and damage to UNIVER S.p.A. products and third party products due to non-observance of the information contained in this manual.*

### Intended Use

*For each individual application, the components supplied are to work with a dedicated hardware and software configuration. Modifications are only permitted within the framework of the possibilities documented in the manuals.*

*All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of UNIVER S.p.A.*

*Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to UNIVER S.p.A.*

### Safety Notes

#### Attention

*Switch off the system prior to working on bus modules!*

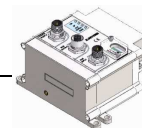
*In the event of deformed contacts, the module in question is to be replaced, as its functionality can no longer be ensured on a long-term basis.*

#### ESD (Electrostatic Discharge)









*The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components, e.g. gold contacts.*

## Terms Definition

<b>DI</b>	Digital Input
<b>DO</b>	Digital Output
<b>I/O</b>	Input/Output
<b>HW</b>	Hardware
<b>LSB</b>	Least Significant Digit
<b>MSD</b>	Most Significant Digit
<b>VLS24</b>	Logic & Sensor power supply
<b>VA24</b>	Output power supply
<b>Com rate</b>	Rate of communications between devices on the network.



## Legend of symbols

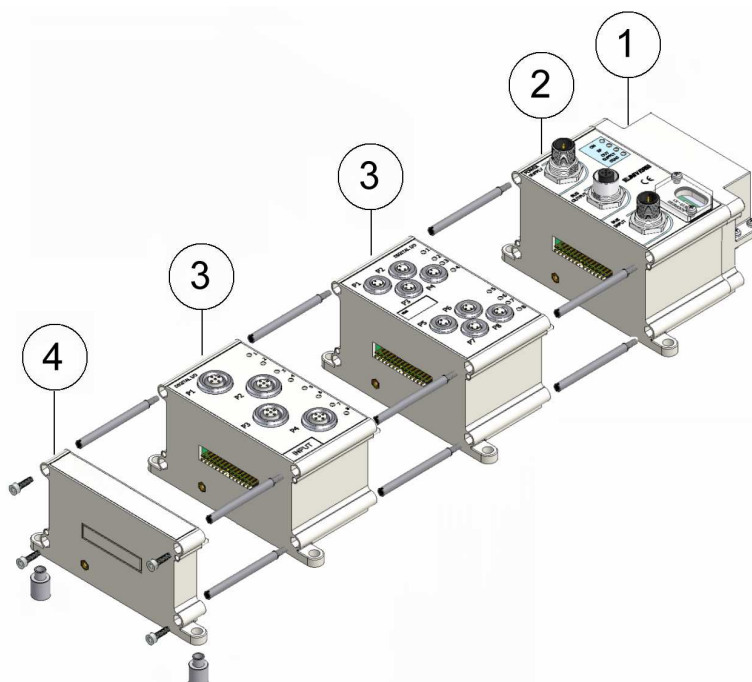
		Important Note
		Attention Danger
		More Information
		Recycling / Recyclable Material

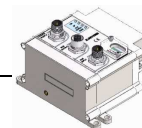
## System description

The TCxx is a modular fieldbus slave device for controlling manifold valve and digital input and output which use **Open** fieldbus.

For further information, please have a look at the EN50170 ProfiBus Standard manual, Parts 1 and 2. Additional information may be found at the official website [www.profibus.com](http://www.profibus.com).

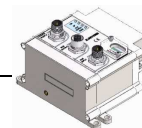
The system structure here described consists of an MANIFOLD OUTPUT INTERFACE (1), of an FIELDBUS module (2) of an AUXILIARY DI modules (3), the end module (4) completes the system.





## Module specifications

<b>FieldBus Data</b>		<b>PROFIBUS DP</b>	
Bus Input Connector		Circular M12 Male 5 pins B code	
		Circular M23 Male 17 pins	
Bus Output Connector		Circular M12 Female 5 pins B code	
		Circular M23 Female 17 pins	
Bus Function Display		ON _ Green	
		BF _ Red	
Auxiliary Function display		Out Supply _ Green	
		Local Diagnostic _ Red	
Address Slave		Switchable 00 to...99	
Communication Rate		9.6Kbaud to 12Mbaud (AutoBode)	
GSD filename / Icon filename		TxxPOA43.GSD/ TxxPOA43.BMP	
Module part code		TCxP	
<b>Electrical Data</b>			
Power Supply connector		Circular M12 4pins male A code	
Logic - Digital Input Voltage Supply VLS24		24 Vdc +/- 20%	
Logic Nominal Current		100mA	
Digital Inputs max Current		1A @ 20°C - overload protected (20mA per input)	
Output voltage Supply VA24		24 Vdc -10 + 15% (valves coil range)	
Output Current VA24 (all output		2,5A max - overload protected	
Output Manifold Valves Capability		24 coil max - (12 bistable valves - 1,5A per 12 coils)	
Auxiliary Digital Output Capability		max 64 digital output	
Auxiliary Digital Input Capability		max 64 digital input	
<b>Environmental Conditions</b>			
weight		370g	
Overall Dimensions		85 x 123 x 75 mm	
MTBF - Mean Time Between Failures		197.359 Hours	50°C
Protection Degree		IP 65	IEC 60529
Relative humidity		5 to 85%	IEC 60068-2-30
Operating Temperature		5°C ÷ 50°C	IEC 60068-2-1
Storage Temperature		-25°C ÷ 80°C	IEC 60068-2-2
Vibration		5g tested 10-500Hz	IEC 60068-2-6
Shock operating		22g	IEC 60068-2-27

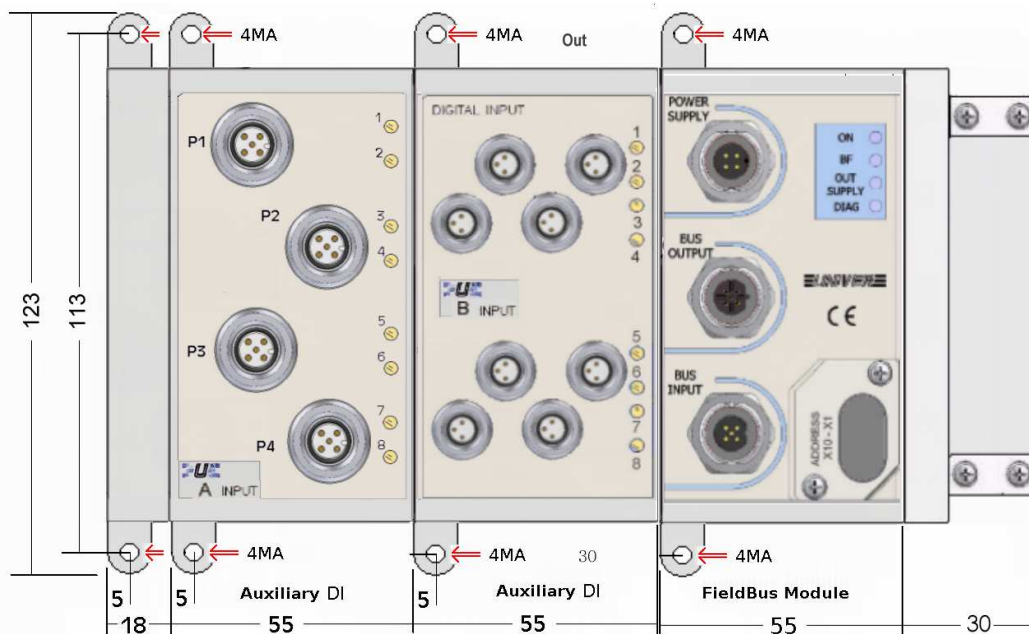


## Module installation

Before installing the module, verify that all its parts are intact and have not been damaged during transport, pay attention to the overall dimensions.

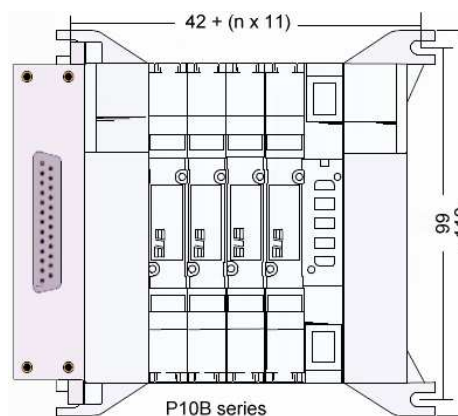


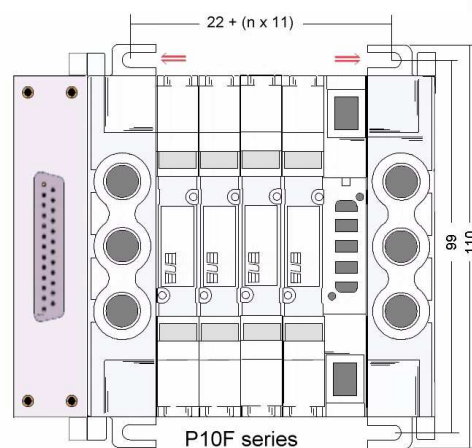
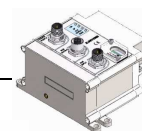
**We do recommend to fix the device in the specified hole with M4 screws on a single metal surface to grant a good ground connection**



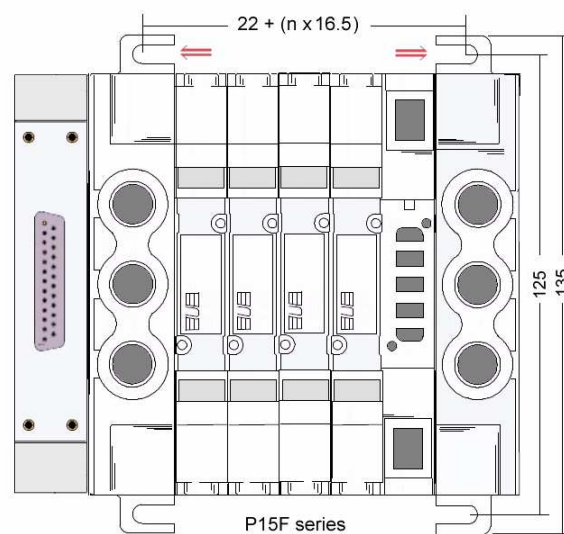
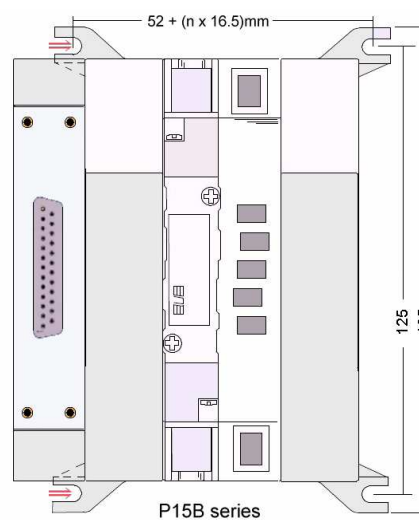
**The overall length changes according to the numbers of the auxiliary I/O modules used and manifold valves type.**

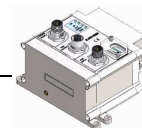
## P10 Compact manifold dimensions



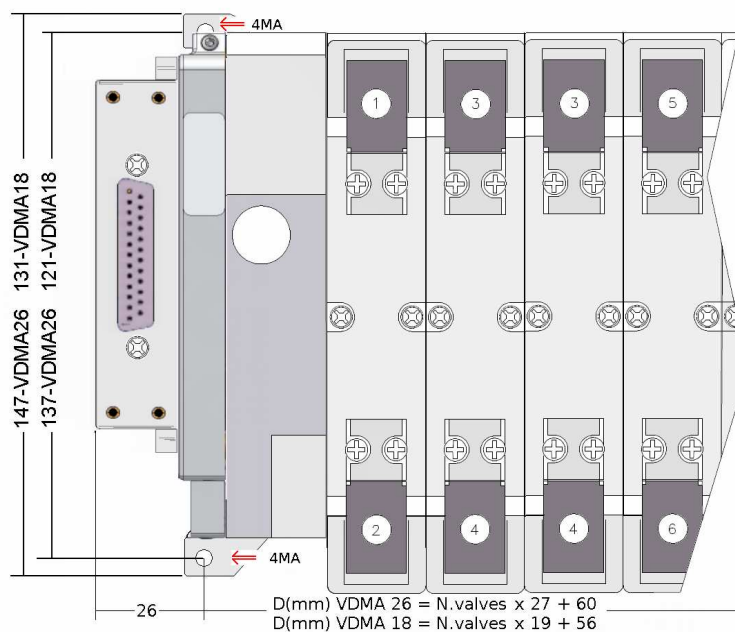


### P15 Compact manifold dimentions

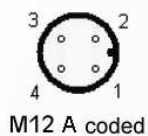




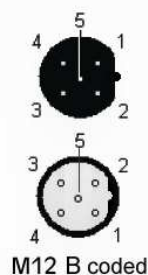
## ISO VDMA manifold dimentions



## Connectors pin assignement



Aux Supply (MALE)  
Looking into pins

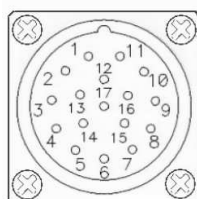


Bus OUT (FEMALE)  
Looking into socket

Bus IN (MALE)  
Looking into pins

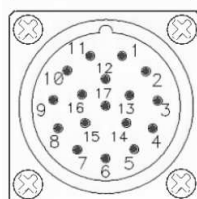
Pin	Function
1	VLS24 Logic/Sensor Supply
2	0VA VA24 common
3	OVLS VLS24 common
4	VA24 Output Supply

Pin	IN	OUT
1	NC	+5V
2	A	Line
3	0V	
4	B	Line
5	NC	
Thread	Used for shielding	



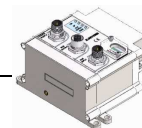
17pins M23

Bus OUT (FEMALE)  
Looking into socket



Bus IN (MALE)  
Looking into pins

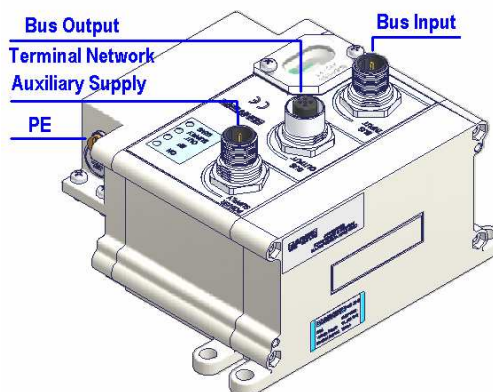
Pin	Function
1	0VLS
2	0VA
3	VA24
4	VLS24
5	PE
6	B Line
11	A Line
15	Reserved
16	Reserved
	Case Connector PE



## System supply connection

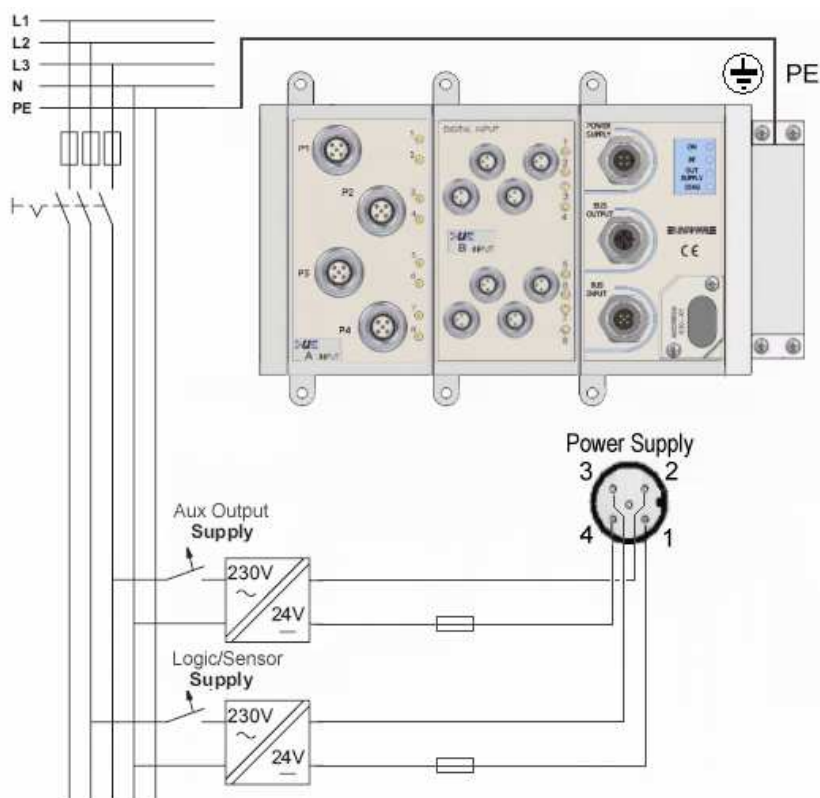


**The PE connection has to be connected externally to the ground**

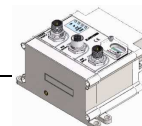


The fieldbus module requires a dual power supply, the fieldbus AS-I supply and the 24 Vdc supply (-10% or +15 %) for output manifold valves.

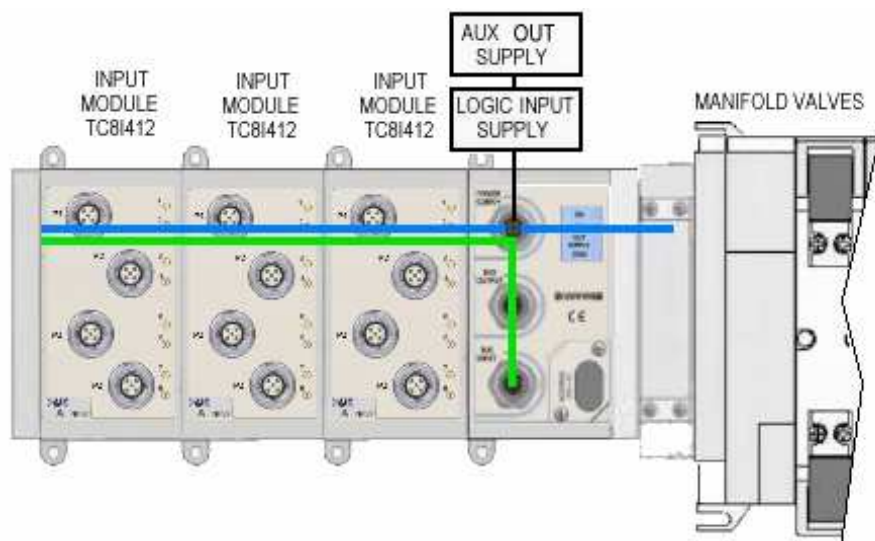
### Supply Example



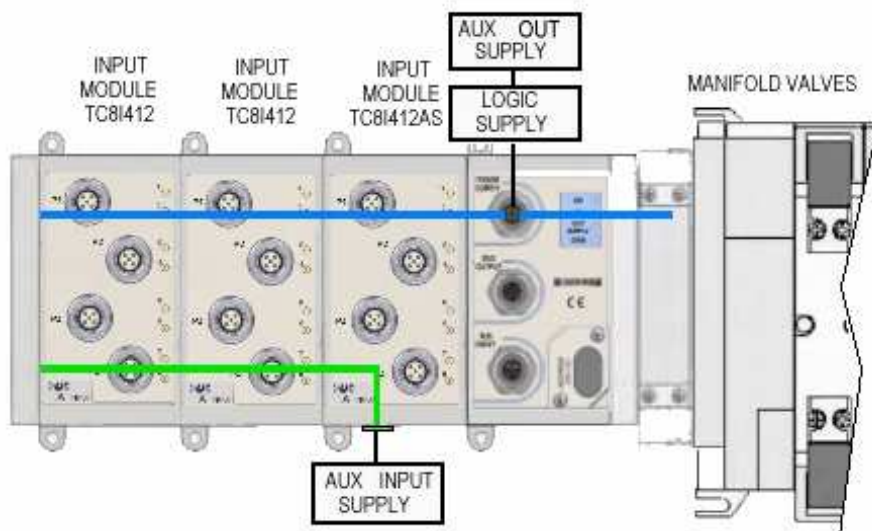
**Connect the module to the appropriate PROFIBUS network cable in accordance with the abovetable:**

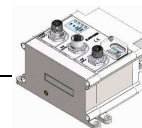


## Dual Power Supply System



## Triple Power Supply System using TC8I412AS Input Module





## Terminal network resistor

A ProfiBus net system must be terminated at each end of the trunk line. The host controller and the last slave on the network must always be terminated to eliminate reflections, The ProfiBus specifications for the terminating resistor are:

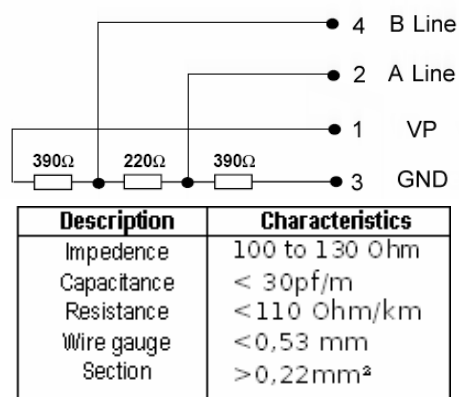
2 x 390 - 1 x 220ohm  
1% metal film ¼ Watt

Terminating connector (part No. **TZ-M5M12-BT** on the Output Bus connector

The TCMP device include automatic terminating resistor function when there is not the Bus Output connected.



PROFIBUS cable  
specification

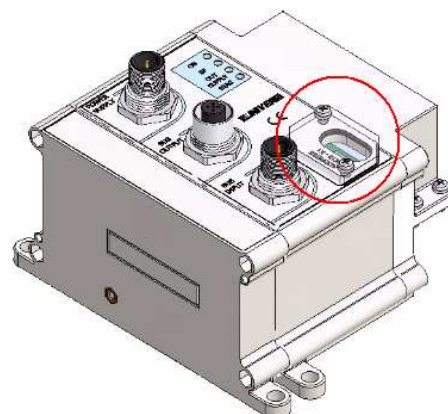
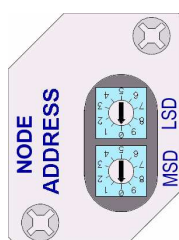


## How to set the module address

Max Valid Node Address are **01 to 99**

Each module is delivered set for node address **10**

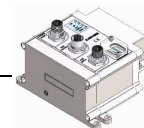
The Dip or Rotary switches, are located on the top panel.



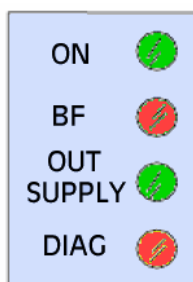
Rotary Switch	MSD X10 <i>Most Significant Digit</i>	LSD X1 <i>Least Significant Digit</i>
Address Set	<b>1</b>	<b>0</b>



**To set the address, remove the cover, tourn rotary switch to the desired address, tourn OFF the device and then tourn ON again(The address is read only at power up)  
Remember to close the cover cap again to guarantee the protection degree**

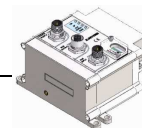


## Module diagnostic and status indicators

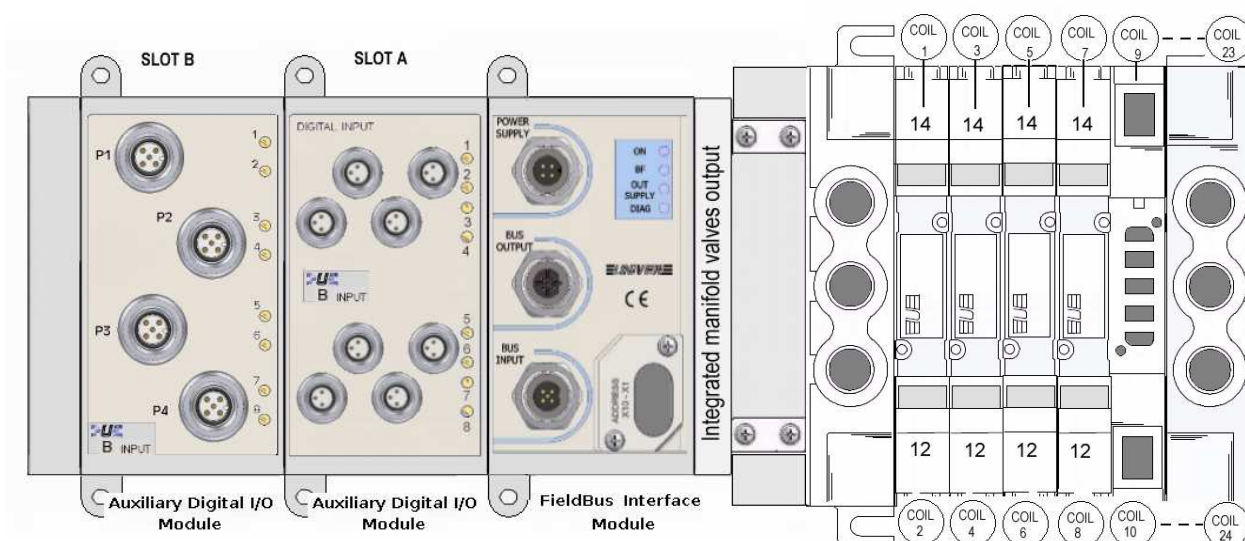


For Network diagnostic functions see pg.14

Des.	Colour LED	Meaning
<b>ON</b>	<b>Green</b>	System ready
	<b>ON:</b>	Node power ON & ready
	<b>OFF:</b>	Node off-line or not powered
<b>BF</b>	<b>Red</b>	Bus Fault
	<b>ON:</b>	Bus disconnected
	<b>OFF:</b>	Bus connected
	<b>FLASH:</b>	Configuration error or Address error
<b>OUT SUPPLY</b>	<b>Green</b>	Actuator Supply
	<b>ON:</b>	Actuator Supply present
	<b>OFF:</b>	Actuator Supply missing
<b>DIAG</b>	<b>Red</b>	Diagnostic
	<b>OFF:</b>	No error
	<b>FLASH:1</b>	Actuator supply missing
	<b>FLASH:2</b>	Output overload
	<b>FLASH:3</b>	High noise level
	<b>FLASH:4</b>	Auxiliary Modules Fail
	<b>FLASH:5</b>	No I/O module detected
	<b>FLASH:6</b>	Reserved
	<b>FLASH:7</b>	Reserved
	<b>FLASH:8</b>	Unknown module
	<b>FLASH:9</b>	Input supply missing or protection active
	<b>FLASH:10</b>	Reserved
	<b>FLASH:11</b>	Reserved



## Valves coils & Input/Output data allocation



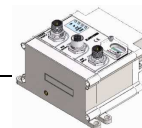
**The physical position of the expansion modules establishes the increment of the Data-Byte allocation according to a sequence which evolves increasingly from the FieldBus module to the left.**

## Output manifold valves consumes-data definition

		Coil	Byte-Bit Consumes	Coil	Byte-Bit Consumes	Coil	Byte-Bit Consumes
<b>Valve Function</b>	side14	1	0-1	9	1-0	17	2-0
	side12	2	0-2	10	1-1	18	2-1
	side14	3	0-3	11	1-2	19	2-2
	side12	4	0-4	12	1-3	20	2-3
	side14	5	0-5	13	1-4	21	2-4
	side12	6	0-6	14	1-5	22	2-5
	side14	7	0-7	15	1-6	23	2-6
	side12	8	0-0	16	1-7	24	2-7



**The digital output manifold valves use always 24 Bit(3 Byte).**



### Auxiliary Digital OUTPUT consumes-data definition.

		Byte-Bit Consumes				
Module Slot		A	B	C	D	E
Port-Pin Function	P 1-4	3-0	4-0	5-0	6-0	7-0
	P 1-2	3-1	4-1	5-1	6-1	7-1
	P 2-4	3-2	4-2	5-2	6-2	7-2
	P 2-2	3-3	4-3	5-3	6-3	7-3
	P 3-4	3-4	4-4	5-4	6-4	7-4
	P 3-2	3-5	4-5	5-5	6-5	7-5
	P 4-4	3-6	4-6	5-6	6-6	7-6
	P 4-2	3-7	4-7	5-7	6-7	7-7



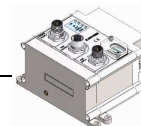
*The maximum auxiliary digital output configurable are 40 Bit(5 Byte).*

### Auxiliary Digital INPUT produces-data definition

		Byte-Bit Produces						
Module Slot		A	B	C	D	E	G	H
Port-Pin Function	P 1-4	0-1	1-0	2-0	3-0	4-0	5-0	6-0
	P 1-2	0-2	1-1	2-1	3-1	4-1	5-1	6-1
	P 2-4	0-3	1-2	2-2	3-2	4-2	5-2	6-2
	P 2-2	0-4	1-3	2-3	3-3	4-3	5-3	6-3
	P 3-4	0-5	1-4	2-4	3-4	4-4	5-4	6-4
	P 3-2	0-6	1-5	2-5	3-5	4-5	5-5	6-5
	P 4-4	0-7	1-6	2-6	3-6	4-6	5-6	6-6
	P 4-2	0-0	1-7	2-7	3-7	4-7	5-7	6-7



*The maximum auxiliary digital input configurable are 64 Bit(8 Byte).*

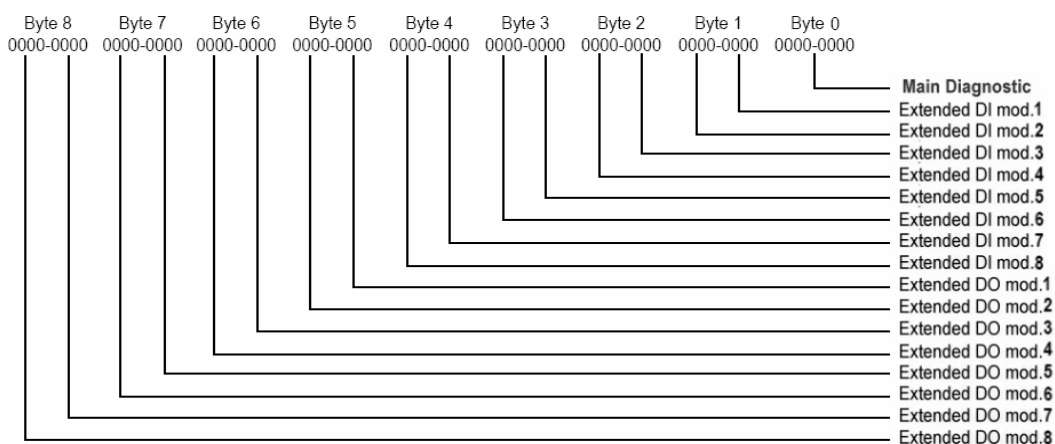


## Diagnostic definition and configuration

The diagnostic provides No.9 Byte which summarizes all the system errors

The first Byte for **MAIN DIAGNOSTIC**

Eight Byte for. **EXTENDED INPUT/OUTPUT DIAGNOSTIC MODULE**

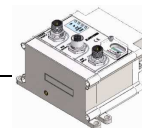


### MAIN DIAGNOSTIC BITS

Bit	Name	Description
0	24V Main power loss	This Bit becomes active when the VA24 is no power supply (pin4 of Power Supply connector). In this condition the coils of the valves are not supplied to even if the logic command is ON.
1	Module fail	This Bit becomes active when the module is in fault condition (replace the module)
2	Output fail	This Bit becomes active, when one or more outputs are overloaded or in short circuit condition for the auxiliary output module (not supported on TB3P and TB4P module)
3	High noise level	This Bit becomes active, when internal bus communication errors are detected, caused by an high level of noise coupling the cables connected to the module
4	24V Input power loss	This Bit becomes active when an overload or short circuit is present in one or more input module connectors
5-6	Reserved	
7	Module info Monitor	This Bit becomes active, when module extended diagnostic are present

### EXTENDED DIAGNOSTIC I/O MODULE NIBBLE

Bin.Code	Description
0000	This Value indicate no error present
0001	This Value indicate VA24 voltage missing ☹
0010	This Value indicate one or more outputs in overloaded or in short circuit condition ☹
0011	This Value indicate detection of internal bus communication errors, caused by an high level of noise coupling the cables connected to the module
0100	This Value indicate module fail
0101	This Value indicate overload or short circuit is present in one or more input module connectors
Note	Code value from <b>0110</b> to <b>1111</b> are not assigned ☹ Output module only



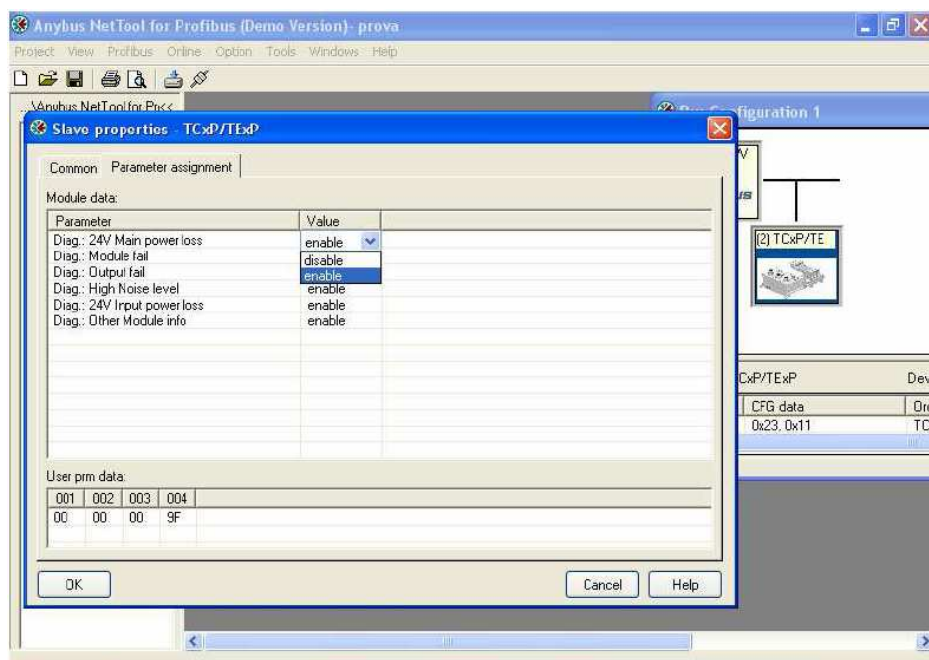
## GSD file specification

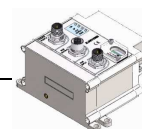
GSD is an abbreviation for the german term "Gerätestammdaten". A GSD is the device database file (also called 'device datasheet') for PROFIBUS devices. The GSD file contains a description of the device. GSD files provide a way for an open configuration tool while reading the device information and recognizing the device characteristics.

From Master configuration Tools  
It's possible enable  
or disable single MAIN DIAGNOSTIC function.

If Other Module Info Function is **disable**  
No **EXTENDED INPUT/OUTPUT DIAGNOSTIC MODULE** error are reported.

If not configured all the function are enable





## Auxiliary Digital I/O modules connection

**COD.TC8I412**

N.8 Digital Input - M12

**COD.TC8I412AS**

N.8 Digital Input - M12 AUX-SUPPLY

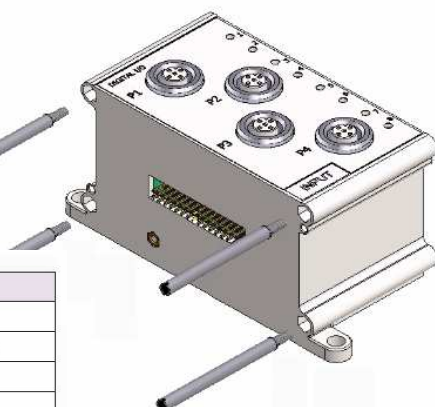
**COD.TC8U412**

N.8 Digital Output - M12



Input / Output  
M12 (Female)  
Looking into sockets

Pin	IN	OUT
1	VS24	NC
2	INP 2	OUT 2
3	0VAS	
4	INP 1	OUT 1
5	NC	



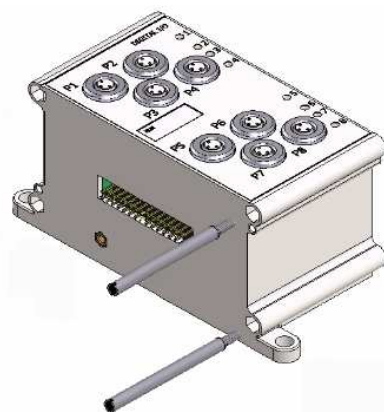
**COD.TC8I808**

N.8 Digital Input - M8



Input M8 (Female)  
Looking into sockets

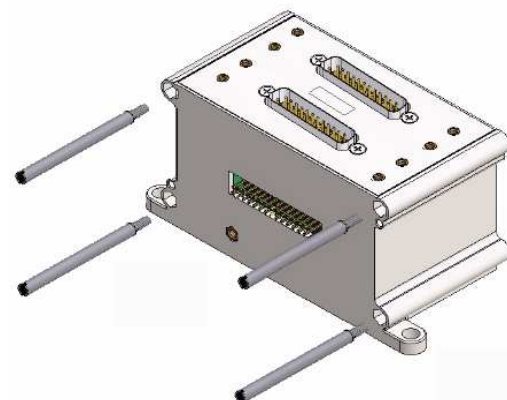
Pin	IN
1	VS24
4	INP
3	0VAS



P1-P2 Pin No.	Part Code TCR32ID	Part Code TCR32UD
1	Input 0-0	Output 0-0
2	Input 0-1	Output 0-1
3	Input 0-2	Output 0-2
4	Input 0-3	Output 0-3
5	Input 0-4	Output 0-4
6	Input 0-5	Output 0-5
7	Input 0-6	Output 0-6
8	Input 0-7	Output 0-7
9	Input 1-0	Output 1-0
10	Input 1-1	Output 1-1
11	Input 1-2	Output 1-2
12	Input 1-3	Output 1-3
13	Input 1-4	Output 1-4
14	Input 1-5	Output 1-5
15	Input 1-6	Output 1-6
16	Input 1-7	Output 1-7
17/18	NC	NC
19/20	0V	0V
21/22	+INP SUPPLY	NC
23/24	0V	0V GND
25	SHIELD	SHIELD



Max radius of the curve:  
static 80mm, dynamic 120mm  
Outer diameter 8mm, PG9

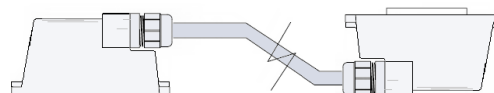


**COD. TCR32UD**

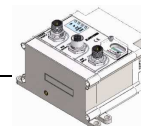
16+16 Digital Output  
Remote module

**COD. TCR32ID**

16+16 Digital Input  
Remote module



**TSCFN16D000**



## Auxiliary Digital I/O modules specifications

### Input Module Specification

Part Code	TC8I412	TC8I808	TCR32ID
Termination type	Circular 4 x M12	Circular 8 x M8	Sub D 2 x 25pins
Input per Module	8	8	16 + 16
Switching Logic	2 or 3 wire PNP devices		
Operating Voltage Supply <b>VS24</b>	24V dc +/- 25%		
Power dissipation max per module	0,18W		
Sensor Source Current per input	20mA		
Signal logic "OFF"	-30V dc to 5V dc		
Signal logic "ON"	13V dc to 30V dc		
Typical input Current ON state max	5mA		
Typical input Current OFF state max	1,1mA		
Nominal Impedence	5Kohm		
Delay Time ON to OFF	1mS		
Status Display	Valid Input – yellow indicator ON		

### Output Module Specification

Part Code	TC8U412	TCR32UD
Termination type	Circular 4 x M12 size	Sub D 2 x 25pins
Output per module	8	16 + 16
Switching Logic	Sourcing Output	
Output Voltage Supply <b>VA24</b>	24 V dc +/- 15% (valves coil range)	
Power dissipation max per module	1,8W	
ON state Current per Output	0.3A	
ON state Surge Current per Output 10ms	1.0A	
Overload protected per Output	1.2A	
Module Current rating max	1.5A <b>(1)</b>	
Status Display	Energized Output – yellow indicator ON	

### Environmental Conditions

weight	70g	
Overall Dimentions	30 x 123 x 75 mm	
MTBF - Mean Time Between Failures	197.359 Hours	50°C
Protection Degree	IP 65	IEC 60529
Relative humidity	5 to 85%	IEC 60068-2-30
Operating Temperature	5°C ÷ 50°C	IEC 60068-2-1
Storage Temperature	-25°C ÷ 80°C	IEC 60068-2-2
Vibration	5g tested 10-500Hz	IEC 60068-2-6
Shock operating	22g peak	IEC 60068-2-27

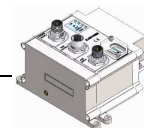


Make sure all connectors and caps are securely tightened to properly seal the connections against leaks and maintain IP65 requirements. I/O cable length should be less than 10 meters

**(1)** The max current available for all output modules included into the system is 2.5Amax.

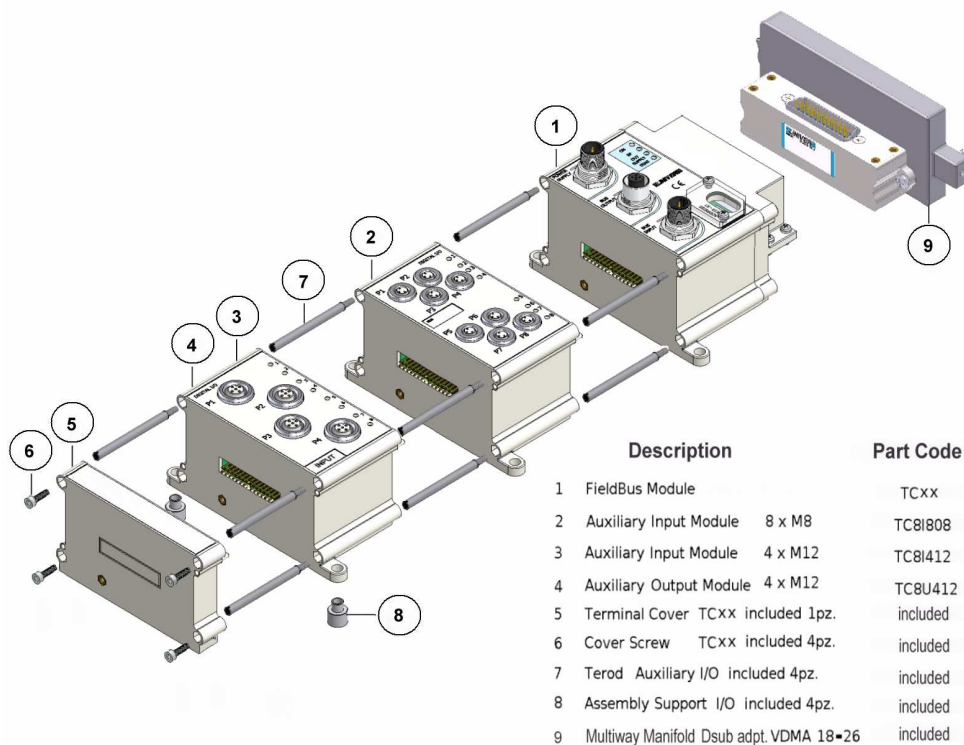
## Identification Label

Model	UNIVER	CE	Protection Degree
Voltage Supply Range	Mod. TCxP	IP65	Production Year
Nominal Current Supply -VL24	Voltage Supply 17..30VDC 100mA	S/N 22482	Serial No.







## Modules assembly system

The auxiliary inputs and outputs modules will be connected to FieldBus module on the opposite side of the manifold valves.



## FieldBus accessories ordering code

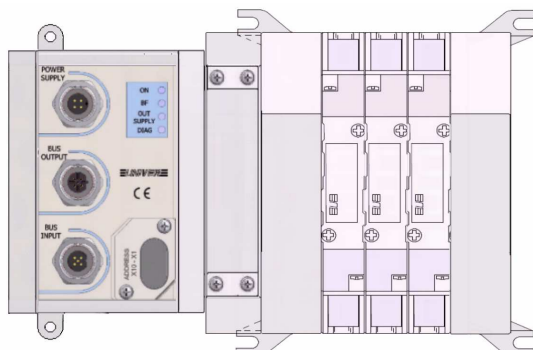
	Description	Size	Type	Protection Degree	Part Code
	(Aux Supply) Profibus DP CANopen Interbus-S	M12 4 pins female	wiring cable	IP65	TZ-F4M12
	(Bus Output) Profibus DP Interbus-S	M12 5 pins male Bcode	wiring cable	IP65	TZ-M5M12-B
	(Bus Input) Profibus DP Interbus-S	M12 5 pins female Bcode	wiring cable	IP65	TZ-F5M12-B
	(Bus Output) Profibus DP Terminator connector	M12 5 pins male Bcode	Terminator	IP65	TZ-M5M12-BT



**Additional accessories for connecting can be found on [www.univer-group.com](http://www.univer-group.com) website**

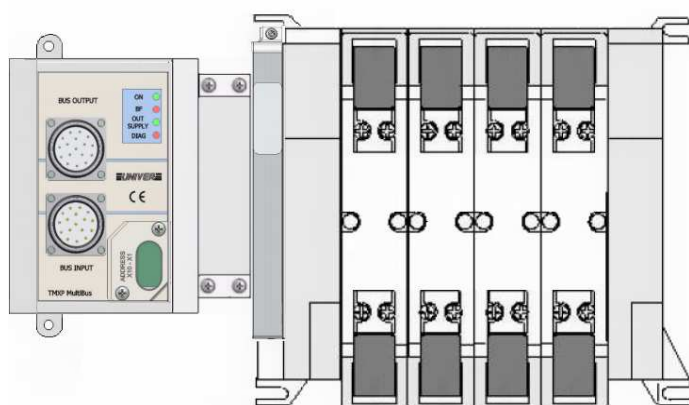


## System configuration examples

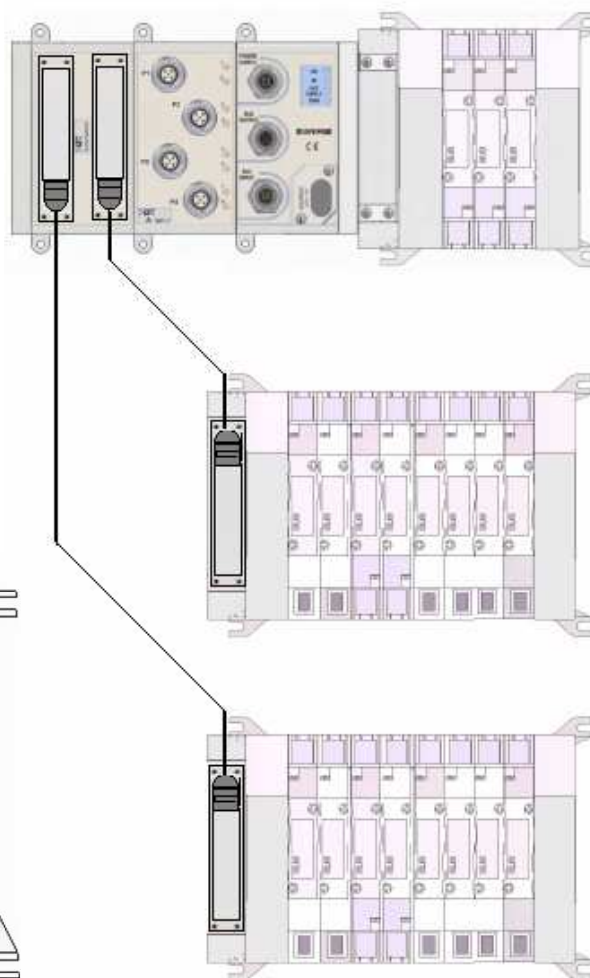


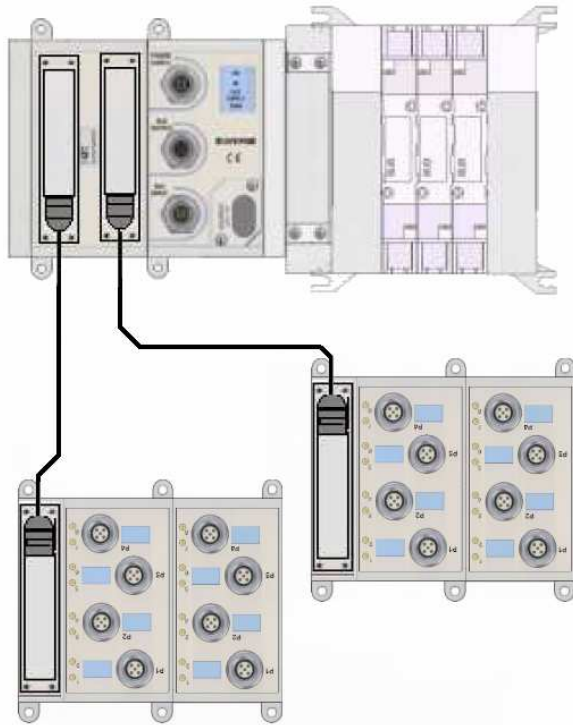
**TCxP** fieldbus device with integrated COMPACT MANIFOLD

**TCxP** fieldbus device with integrated COMPACT MANIFOLD and remote expansion module for distributed manifolds connection

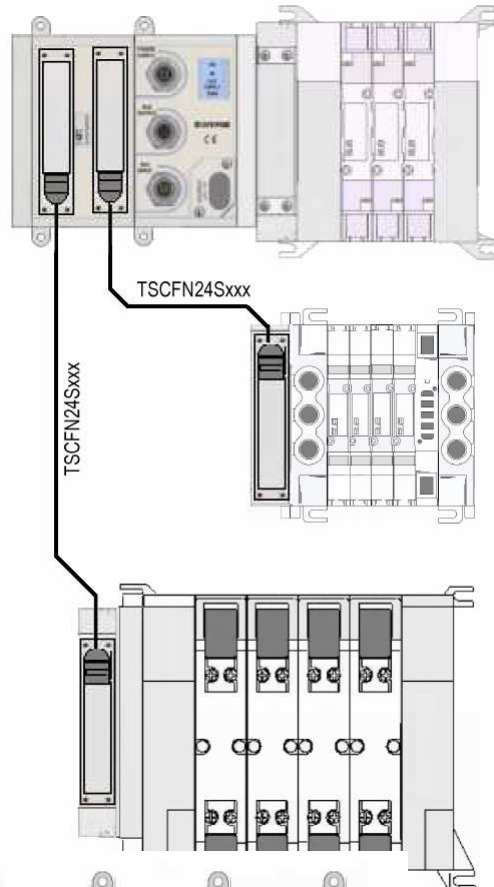


**TCMP** fieldbus device with integrated ISO VDMA MANIFOLD

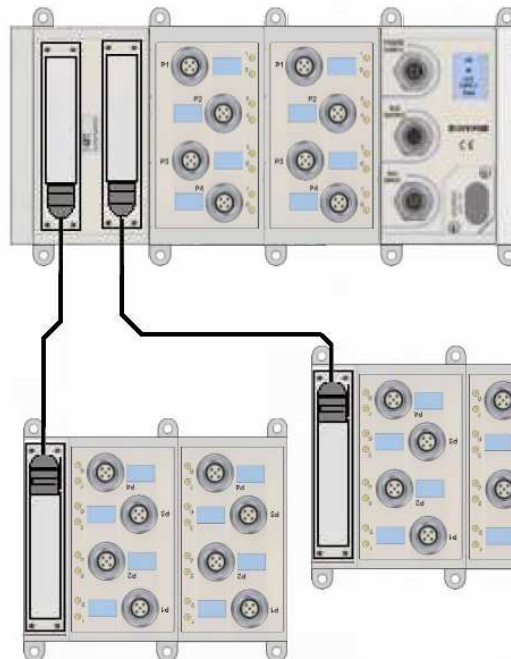




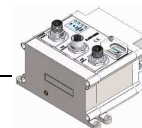
**TCxP** fieldbus device with integrated COMPACT MANIFOLD and remote expansion module for distributed manifolds connection



**TCxP** fieldbus device with integrated COMPACT MANIFOLD and remote expansion module for passive MULTIBOX modules



**TExP** fieldbus device with remote expansion module for passive MULTIBOX modules ➡



### Dangers and residual risks

There aren't residual risks that may cause damage to the health of the person exposed. In case of maintenance, the operator is alerted by a visual sign placed near the high-risky areas, where there could be voltage dangers.

### Dangers caused by improper use



It is recommended to use only original spare parts. They are to be considered including the "misuse conditions " of any modifications or changes of any kind, that the user arbitrarily.

### Correct and incorrect use



The FieldBus Slave control unit, in all its models can be used only as reported on the operative manual manufacturer. The requirements of security and reliability of the unit are guaranteed only by using original components.

### Frequency of programmed maintenance

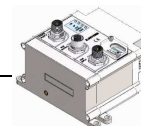
The unit was designed and built so as not to require a specific scheduled maintenance.

### Instructions regarding removal / elimination of waste materials

If you want to disassemble the unit is necessary to observe some basic rules to safeguard the health and the environment.



***Cables, liners and plastic components, must be disposed separately from all other materials  
The metal parts must be grouped by type of material.***



## Conformity declaration

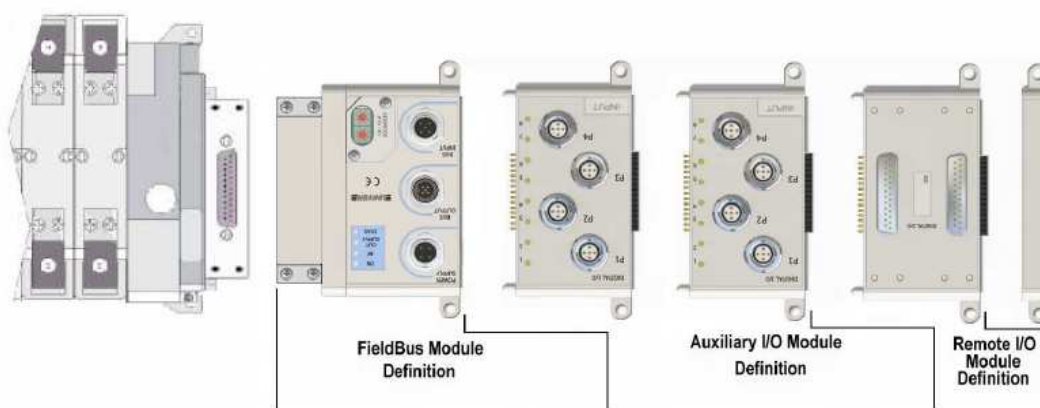
Univer S.p.A. declares under the own responsibility that the Device in object is in compliance with the EMC directive 89/336/EEC, with amendaments for 92/31/EEC and 93/68/EEC through conformance with the following Harmonised European standards:

Date: 9<sup>th</sup> July 2007  
 Device: Remote I/O & Manifold Valves Control  
 Term: TCxP-TEp  
 Manufacturer: Univer S.p.A.  
 Via Eraclito, 31  
 20128 Milano  
 ITALY  
 tel. +39 02252981  
 fax. +39 0225298310

Harmonised European standards:  
 EN 61000-4-3 (1996)  
 EN 61000-4-6 (1996)  
 EN 61000-4-2 (1996)  
 EN 61000-4-4 (1996)  
 EN 61000-4-5 (1995)  
 EN 61000-4-6 (1996)  
 EN 61000-4-8  
 EN 61000-4-11  
 EN 61000-6-2 (1995)  
 EN 61000-6-4 (1993)

R&D Manager signature: 

## Ordering string of fieldbus modules



TC	X	P	00	8	00	32IN
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<b>SERIES</b>		
<b>TC</b>	Manifold plugin & I/O module	
<b>TE</b>	I/O module	
<b>SIZE</b>		
<b>X</b>	Standard connection M12	
<b>M</b>	Multibus connection M23	
<b>FIELDBUS</b>		
<b>A</b>	AS-interface	16+16 I/O
<b>C</b>	CANopen	64+64 I/O
<b>D</b>	DeviceNet	64+64 I/O
<b>I</b>	INTERBUS S	32+32 I/O
<b>P</b>	PROFIBUS dp	64+64 I/O
<b>AUXILIARY DIGITAL INPUT</b>		
<b>N° 08-16-24-32-40-48-56-64</b>		
<b>DIGITAL INPUT TYPE</b>		
<b>S</b>	M12 standard digital input	
<b>A</b>	M12 digital input with auxiliary supply connector	
<b>B</b>	M08 digital input	
<b>AUXILIARY DIGITAL OUTPUT</b>		
<b>N° 08-16-24-32-40-48-56-64</b>		
<b>DIGITAL I/O REMOTE MODULE CONFIGURATION</b>		
<b>32IN</b>	One module - 16+16 digital input	32 DI
<b>64IN</b>	Two modules - 16+16 digital input plus 16+16 digital input	64 DI
<b>32UD</b>	One module - 16+16 digital output	32 DO
<b>32US</b>	One module - 16+16 digital output + switched connector	32 DO
<b>64UD</b>	Two modules - 16+16 digital output plus 16+16 digital output	64 DO
<b>64US</b>	Two modules - 16+16 digital output plus 16+16 digital output + switched connectors	64 DO
<b>3232</b>	One module - 16+16 digital input plus One module - 16+16 digital input	32DI+32DO
<b>6464</b>	One module - 16+16 digital output plus One module - 16+16 digital output	64DI +64DO